

Claims

1. A fuel injector having a pressure booster (3), which is supplied with fuel at high pressure from a pressure source (1) and whose work chamber (4) is separated from a differential pressure chamber (6) via a booster piston (5), and the pressure relief and subjection to pressure of the differential pressure chamber (6) are effected via a switching valve (22) which communicates with the differential pressure chamber (6) via a control line (10), and a pressure chamber (12) on the injection valve member (13) is in communication, via a pressure chamber supply line (11), with a compression chamber (8) of the pressure booster (3), characterized in that the switching valve (22) is a direct-switching 3/2-way valve, whose valve needle (23, 31) is pressure-compensated and has both a sliding seat (24) and a slide seal (25).
2. The fuel injector according to claim 1, characterized in that the switching valve (22) has a first pressure chamber (28) and a second pressure chamber (29), which can be separated from one another by the slide seal (25).
3. The fuel injector according to claim 1, characterized in that the second pressure chamber (29) of the switching valve (22) can be separated from a low-pressure chamber (30) by means of the sliding seat (24).
4. The fuel injector according to claim 1, characterized in that the switching valve (22) has a valve needle (23) that is embodied in one piece.

5. The fuel injector according to claim 1, characterized in that the valve needle (23) has a guide diameter (27) in the valve housing (35) that is substantially equivalent to a diameter (26) of the sliding seat (24) of the valve needle (23).

6. The fuel injector according to claim 1, characterized in that the valve needle (23) includes a valve needle extension (31), which is surrounded by a low-pressure chamber (30).

7. The fuel injector according to claim 1, characterized in that an overflow line (9), communicating with the high-pressure supply line (2), discharges into the first pressure chamber (28) of the switching valve (22), and a control line (10) that subjects the differential pressure chamber (6) of the pressure booster (3) to pressure or pressure-relieves discharges into the second pressure chamber (29) of the switching valve (22), and the pressure chambers (28) can be separated from one another or made to communicate with one another via the slide seal (25) in accordance with the reciprocating motion of the valve needle (23).

8. The fuel injector according to claim 1, characterized in that the sliding seat (24) is embodied as a cone seat or a flat seat on the end of the valve needle (23) toward the low-pressure chamber.

9. The fuel injector according to claim 4, characterized in that the valve needle (23) embodied in one piece is received in a valve housing (35) embodied in one piece.

10. The fuel injector according to claim 4, characterized in that the valve needle (23) embodied in one piece is received in a valve housing (35) embodied in more than one piece.

11. The fuel injector according to claim 5, characterized in that the guide diameter (27) of the valve needle (23) is equivalent to the diameter of the slide seal (25).